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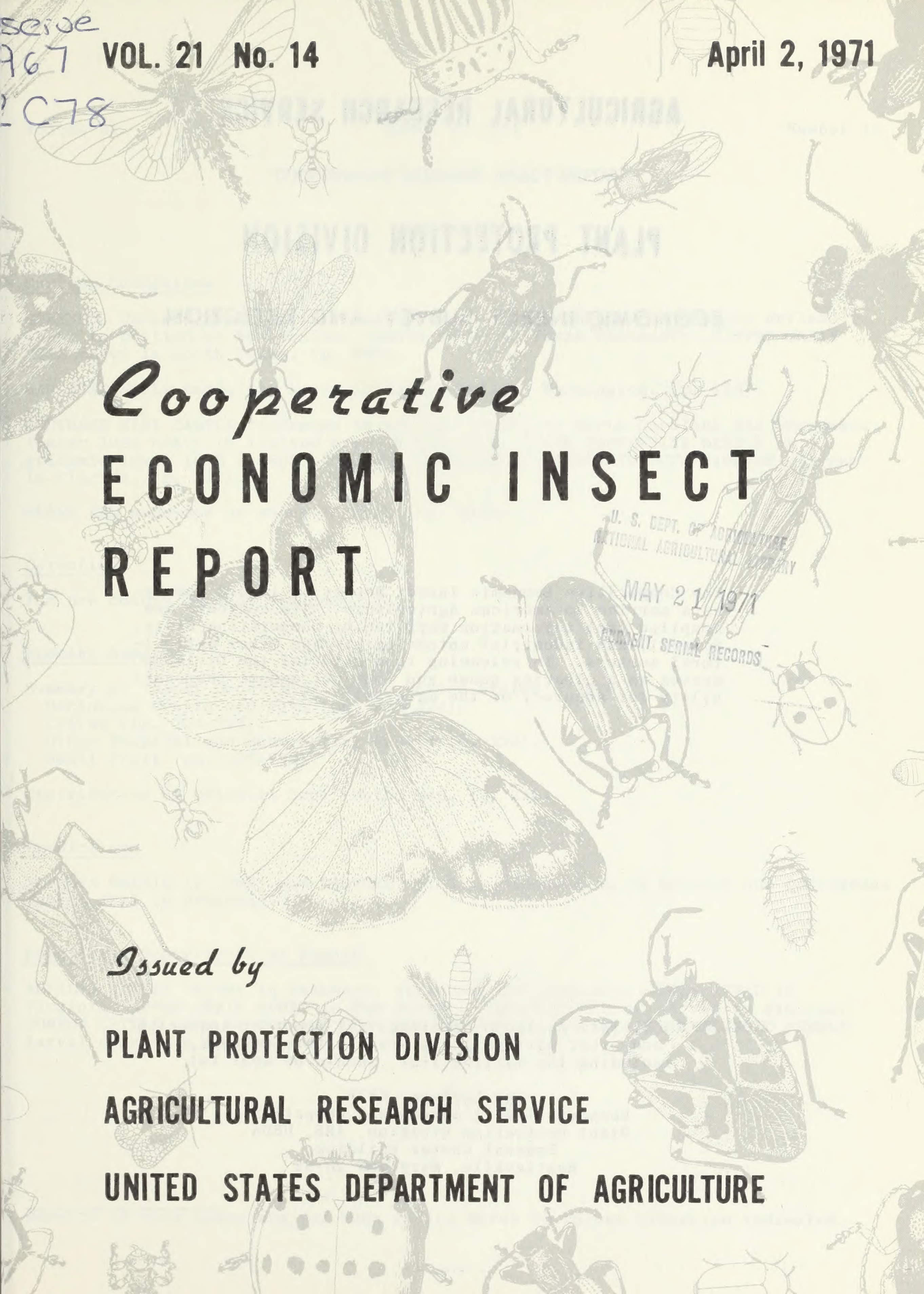

Cooperative ECONOMIC INSECT REPORT

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PLANT PROTECTION DIVISION
AGRICULTURAL RESEARCH SERVICE
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AGRICULTURAL RESEARCH SERVICE

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ECONOMIC INSECT SURVEY AND DETECTION

The Cooperative Economic Insect Report is issued weekly as a service to American Agriculture. Its contents are compiled from information supplied by cooperating State, Federal, and industrial entomologists and other agricultural workers. In releasing this material the Division serves as a clearing house and does not assume responsibility for accuracy of the material.

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Volume 21 April 2, 1971 Number 14

COOPERATIVE ECONOMIC INSECT REPORT

HIGHLIGHTS

Current Conditions

GREENBUG damaged small grain in north Texas. BROWN WHEAT MITE damaged dryland wheat in portion of New Mexico; counts heavy in Texas Panhandle. WINTER GRAIN MITE heavy in north Texas. (p. 209).

SAN JOSE SCALE mortality heavy in Yakima Valley, Washington. (p. 210).

SOUTHERN PINE BEETLE increased to serious levels in North Carolina and Tennessee; timber loss heavy in limited area of Virginia. BLACK TURPENTINE BEETLE at epidemic level in 2 forests in South Carolina. A GEOMETRID MOTH damaged cypress in Florida. (p. 211).

SHEEP KED numerous on sheep in Utah. (p. 212).

Detection

For new county records see page 213.

Special Reports

Summary of Insect Conditions in the United States - 1970
  Deciduous Fruits and Nuts (pp. 215-224).
  Citrus (pp. 224-226).
  Other Tropical and Subtropical Fruits (p. 226).
  Small Fruit (pp. 226-228).

Distribution of Oriental Fruit Moth. Map. (p. 218).

Predictions

ALFALFA WEEVIL (p. 209) and BAGWORM (p. 211) expected to be heavier and widespread during 1971 in Arkansas.

Some First Occurrences of Season

ALFALFA WEEVIL larvae in Delaware, Virginia, and Kentucky. APPLE APHID in Virginia. APPLE GRAIN APHID in New Jersey. POPLAR TENTMAKER larvae in Florida. COMMON CATTLE GRUB adults and HORN FLY adults in Oklahoma. WHITEFRINGED BEETLE larval damage in Alabama.

Reports in this issue are for week ending March 26 unless otherwise indicated.

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WEATHER OF THE WEEK ENDING MARCH 29

HIGHLIGHTS: The East continued cold. Record high temperatures occurred in Texas on Sunday. Snowfall since last autumn at some northeastern locations has exceeded previous seasonal totals.

PRECIPITATION: Rain fell along the Pacific coast on most days last week with snow in the higher mountains. The Southwest was mostly sunny and clear. Squally weather persisted in the lee of the Great Lakes. Scattered thunderstorms dotted the Deep South. A storm developed in the central Rocky Mountains early in the week and moved to the adjacent Great Plains. Snow, blowing snow, and fog reduced visibility at Sidney, Nebraska, to near zero. By Wednesday morning, 8 inches of snow covered Cheyenne, Wyoming. Some schools in south-central Nebraska closed Wednesday due to blowing and drifting snow. Five to 10 inches of snow fell along the middle portion of the Nebraska-Kansas line. Snow spread eastward and by Thursday, the snow belt extended from central Nebraska and Kansas to western Kentucky. By Friday morning, the snow area had reached Georgia and the Carolinas. Snow covered the ground at Columbus, Georgia, and was 10.5 inches deep at Clemson, South Carolina. Four to 8 inches of snow fell in the mountains in western North Carolina. By Friday evening, the storm had dumped heavy snow in Virginia--13 inches of snow at Blackstone, 10 inches at Newport News, and 8 inches at Richmond. By Saturday, the storm center had moved off the Atlantic coast. Sunday a new storm began battering the northern Pacific coast with high winds and rain. Snow fell in the mountains of Washington and Oregon and eastward to the Rockies.

TEMPERATURE: Winter temperatures continued in the Northern States, but summer weather persisted in the South. Alice, Texas, registered 99° Monday afternoon. Austin, Texas, recorded 96° Monday afternoon, but a cold wave dropped the temperature at Austin to 51° by Tuesday morning. Afternoon temperatures in the northern Great Plains remained in the 20's and low 30's. Maximum readings at Minot, North Dakota, and Bemidji, Minnesota, Tuesday were 20°. Cool air continued to pour into the Northern States and spread southward. Devils Lake, North Dakota, registered -10° Wednesday morning. The freezing line pushed southward to central Alabama and 17° minimums were recorded at Lexington and London in Kentucky and Crossville, Tennessee. Subzero temperatures occurred in several northern States Thursday morning. The coldest readings that came to our attention were -12° at Iron River and Marquette Airport in Michigan. Warm weather persisted in the extreme South throughout the week. Weather of the week continued on page 214.

SPECIAL INSECTS OF REGIONAL SIGNIFICANCE

ARMY CUTWORM (*Euxoa auxiliaris*) - OKLAHOMA - Larvae per 10 linear feet of wheat ranged 0-4 in 11 of 30 fields in northwest area and 0-2 in 1 of 2 fields in Garfield County. Occasional larvae in alfalfa in Harper and Alfalfa Counties. (Okla. Coop. Sur.).

CORN LEAF APHID (*Rhopalosiphum maidis*) - ARIZONA - Counts of 20-60 per boot in 4 Yuma Valley barleyfields, Yuma County. (Ariz. Coop. Sur.). NEW MEXICO - Heavy in isolated barley in Luna County. Damage due to this aphid and lack of moisture severe. (N.M. Coop. Rpt.).

GREENBUG (*Schizaphis graminum*) - ARIZONA - Averaged 2,000 per 100 sweeps of barley and wheat at Yuma, Yuma County. Counts of 0-1 per linear foot of 10-inch tall plants in 4 fields of barley in Pinal County. Controls applied to barley in one field northeast of Glendale, Maricopa County. (Ariz. Coop. Sur.). NEW MEXICO - Ranged 50-200 per linear foot of wheat in Quay, Curry, and Roosevelt Counties. (Mathews). TEXAS - Heavy damage to small grains in Childress, Baylor, Wichita, Young, Knox, Wilbarger, Cottle, King, Motley, and Foard Counties. Moderate damage in Archer County. Small grains need moisture and greenbug feeding adding to problem. Some control being applied. Numerous beneficial insects in some fields. (Boring). Ranged 5-1,500 per row foot of small grain in 18 Panhandle counties. Heaviest count in Floyd County, lightest in Motley and Lamb Counties. Lady beetles numerous in Hall, Motley, and Floyd Counties. Bracondids also in Motley and Floyd Counties. (Daniels). OKLAHOMA - Ranged 15-250 per linear foot of wheat in Major County except one field with average of 550 per linear foot. Averaged 300 in Alfalfa County field; ranged 6-45 per linear foot in other fields. Ranged 3-70 per linear foot in 3 northwest counties. Ranged 0-8 per linear foot in Harper County. Averaged 7 and 170 per linear foot in 2 Garfield County fields. Remains heavy in Cotton County, light in Kingfisher and Murray Counties. (Okla. Coop. Sur.).

SPOTTED ALFALFA APHID (*Therioaphis maculata*) - NEW MEXICO - Light to heavy on alfalfa in Quay, Curry, and Roosevelt Counties. Ranged 10-100 per square foot in some fields. (Mathews). TEXAS - Moderate on alfalfa in Wilbarger and Foard Counties. Beneficial insects numerous in many fields. (Boring).

SMALL GRAINS

BROWN WHEAT MITE (*Petrobia latens*) - OKLAHOMA - Light, up to 100 per linear foot, in most wheat in Woods, Harper, and Woodward Counties and some Major County fields. Moderate in scattered fields in Garfield County. (Okla. Coop. Sur.). TEXAS - Ranged 1,000-5,000 per linear foot of wheat in several Panhandle counties. (Daniels). NEW MEXICO - Light to heavy on wheat in Quay, Curry, and Roosevelt Counties. Damage heavy to much dryland wheat in this area. (Mathews).

WINTER GRAIN MITE (*Penthaleus major*) - TEXAS - Heavy in Wilbarger, Foard, and Knox County small grain. (Boring).

FORAGE LEGUMES

ALFALFA WEEVIL (*Hypera postica*) - DELAWARE - First instars averaged 1 per 10 stalks of new growth alfalfa in one area of Kent County. (Burbutis, Kelsey). VIRGINIA - First and second instars ranged 1-10 per stem at 2 locations in Charlotte County. (Hendrick). KENTUCKY - Eggs averaged 244 per square foot of alfalfa in Fayette County. First instars appeared. (Barnett). TENNESSEE - First and second instars ranged 3-7 per terminal on 90 percent of alfalfa checked in central areas. Damage very light to date. (Gordon). Surveys indicate first and second instars in most east area fields. No damage to date. (Mullett). ARKANSAS - Larvae numerous and near control levels on 4-inch tall alfalfa in Crittenden County. (Kimbrough). Expect alfalfa weevil to be heavier and more widespread than previously. Larvae found north to Logan and Yell Counties. (Boyer, Jones). OKLAHOMA - Larvae heavy in Murray, Bryan, and Cotton Counties. Moderate in Carter County. Light in Tillman, Comanche, and Johnston Counties. (Okla. Coop. Sur.).

EGYPTIAN ALFALFA WEEVIL (Hypera brunneipennis) - ARIZONA - Ranged 0-300 per 100 sweeps of alfalfa in 4 Yuma and Gila Valley, Yuma County, fields. One grower "sheeping off" alfalfa and reduced weevils to noneconomic levels. (Ariz. Coop. Sur.).

CLOVER LEAF WEEVIL (Hypera punctata) - OKLAHOMA - Occasional larvae in alfalfa in Harper and Beckham Counties. (Okla. Coop. Sur.).

PEA APHID (Acyrthosiphon pisum) - ARKANSAS - Increased and variable in Crittenden County alfalfa. (Kimbrough). OKLAHOMA - Moderate to heavy in scattered alfalfa in Cotton, Tillman, and Comanche Counties. Averaged 20 per sweep in Johnston County. (Okla. Coop. Sur.). NEVADA - Averaged 4 per sweep in Moapa Valley, Clark County, alfalfa hayfields. (Zoller). ARIZONA - Increased, ranged 1,000-8,000 per 100 sweeps of alfalfa, in Yuma County. (Ariz. Coop. Sur.).

LYGUS BUGS (Lygus spp.) - ARIZONA - Mostly nymphs ranged 10-70 per 100 sweeps in 4 fields of alfalfa at Yuma, Yuma County. (Ariz. Coop. Sur.).

GENERAL VEGETABLES

GREEN PEACH APHID (Myzus persicae) - ARIZONA - Still treating lettuce at Yuma and at Picacho. (Ariz. Coop. Sur.).

DECIDUOUS FRUITS AND NUTS

APHIDS - NEW JERSEY - Rhopalosiphum fitchii (apple grain aphid) feeding on bud of Red Delicious apples in commercial block on March 22 near Vincentown, Burlington County. (Ins.-Dis. Newsltr.). VIRGINIA - Aphis pomi (apple aphid) hatched on apple at Charlottesville, Charlotte County, on March 17. (Bobb). COLORADO - Myzus persicae (green peach aphid) eggs 95 percent hatched on March 16 on Western Slope. Eggs averaged 2.2 and nymphs 7 per 100 fruit buds in peach orchards. Population levels comparable to 1970 season so far. (Bulla).

EUROPEAN RED MITE (Panonychus ulmi) - NEW JERSEY - Overwintering eggs light to moderate in commercial apple orchard near Vincentown, Burlington County, March 22. (Ins.-Dis. Newsltr.).

TWOSPOTTED SPIDER MITE (Tetranychus urticae) - COLORADO - This species and Bryobia praetiosa (clover mite) appearing in apple orchards on Western Slope, March 16. Dormant sprays applied in apple, pear, and peach orchards with buds mostly in dormant stage. (Bulla).

SAN JOSE SCALE (Quadraspidiotus perniciosus) - WASHINGTON - Surveys of apples in upper and lower Yakima Valley showed heavy mortality of all overwintering forms, apparently due to sudden low temperatures following moderate weather in February. (Johnson).

PEAR PSYLLA (Psylla pyricola) - WASHINGTON - Eggs found March 16 on up to 60 percent of pear spurs in unsprayed orchards in upper Yakima Valley. Controls satisfactory. (Johnson).

EASTERN TENT CATERPILLAR (Malcosoma americanum) - OKLAHOMA - Hatched on wild plum in Atoka County on March 19. (Okla. Coop. Sur.).

CITRUS

AN ARMORED SCALE (Unaspis citri) - FLORIDA - Severe on 250 citrus trees in nursery at Vero Beach, Indian River County. (Kendrick).

ORNAMENTALS

HOLLYHOCK WEEVIL (*Apion longirostre*) - MISSOURI - Adults collected in blacklight trap in Platte County by L.P. Burgess on May 28, 1970. This is a new county record. (Munson).

AN ARMORED SCALE (*Odonaspis penicillata*) - FLORIDA - All stages collected on stems and leaves of bamboo plant at Summerland Key, Monroe County, March 8, 1971, by W.H. Pierce. This is a new county record. (Fla. Coop. Sur.).

BOXWOOD LEAFMINER (*Monarthropalpus buxi*) - VIRGINIA - Damage heavy on large planting of American boxwood in Amelia County. (Holmes). Reports indicate heavy damage statewide. (Allen).

FOREST AND SHADE TREES

SOUTHERN PINE BEETLE (*Dendroctonus frontalis*) - Populations increased to serious levels in Tusquitee and Cheach districts of Nantahahala National Forest in western NORTH CAROLINA, and in Tellico district of Cherokee National Forest of TENNESSEE. Heavy timber losses occurred in Accomack County, VIRGINIA. Populations in SOUTH CAROLINA collapsed during summer 1970, currently very light. Also light in TEXAS, LOUISIANA, and MISSISSIPPI, but heavy brood densities could result in timber losses this spring. (South. For. Pest Rptr., Feb.).

BARK BEETLES (*Dendroctonus* spp.) - ALABAMA - *D. frontalis* (southern pine beetle) and *D. terebrans* (black turpentine beetle) damaged isolated pines in Mobile County; numerous pines died during March. (Seibels et al.). SOUTH CAROLINA - *D. terebrans* remains at epidemic level in Sand Hills and Cheraw State Forests located in north-central area of State. (South. For. Pest Rptr., Feb.).

BAGWORM (*Thyridopteryx ephemeraeformis*) - ARKANSAS - Populations epidemic during summer 1970 in northwest area. Radigraphs show heavy winter egg survival. Should survival be above average, populations may be more widespread and severe during 1971. (South. For. Pest Rptr., Feb.).

A GEOMETRID MOTH (*Anacamptodes cypressaria*) - FLORIDA - Defoliation moderate to heavy on 15,000 acres of cypress in Glades County. (Fla. Div. For., Feb.).

BALSAM WOOLLY APHID (*Adelges piceae*) - New infestations on Roan Mountain in TENNESSEE and NORTH CAROLINA; also near Heintooga Overlook and along Blue Ridge Parkway in Balsam Mountains of North Carolina. Aphid reinfesting protection zone on Mt. Mitchell. (South. For. Pest Rptr., Feb.).

PINE BARK APHID (*Pineus strobi*) - MARYLAND - Immatures on several white pines in Greenbelt, Prince Georges County. White flocculent waxes produced at this time. (U. Md., Ent. Dept.).

WALKINGSTICK (*Diapheromera femorata*) - ARKANSAS - Defoliation of hardwoods heaviest in recent years. Heavy defoliation on 85,000 acres out of 132,729 acres. (South. For. Pest Rptr., Feb.).

COTTONWOOD LEAF BEETLE (*Chrysomela scripta*) - MISSISSIPPI - Adults emerged in Washington and Oktibbeha Counties in association with willows and cottonwoods. (Sartor).

POPLAR TENTMAKER (*Ichthyura inclusa*) - FLORIDA - First instars on willow at Gainesville, Alachua County. Determined by D.H. Habeck. (Mead).

MAN AND ANIMALS

SCREWWORM (*Cochliomyia hominivorax*) - Three cases reported in U.S. March 21-27 as follows: TEXAS - Hidalgo, Jim Hogg, and Starr. Total of 83 laboratory-confirmed cases reported in portion of Barrier Zone in Republic of Mexico as follows: Sonora 17, Chihuahua 13, Nuevo Leon 7, Tamaulipas 46. Total of 24 cases reported in Mexico south of Barrier Zone. Barrier Zone is area where eradication operation underway to prevent establishment of self-sustaining population in U.S. Sterile screwworm flies released: Texas 19,768,000; Mexico 124,028,000. (Anim. Health Div.).

HORN FLY (*Haematobia irritans*) - OKLAHOMA - First adults of season ranged 1-3 per head on cattle in Payne County on March 21. (Okla. Coop. Sur.).

COMMON CATTLE GRUB (*Hypoderma lineatum*) - KENTUCKY - Ranged 0-9 (averaged 3.3) per animal on backs of Holstein cattle of various ages in central areas. (Barnett). OKLAHOMA - First adults in Payne County on March 21. No larvae in backs of 40 steers checked. (Okla. Coop. Sur.). WYOMING - Averaged 36 and 32 per animal in 2 herds of calves in Campbell County. (Lloyd).

MOSQUITOES - CALIFORNIA - Populations receded during past 3 weeks due to cold nights. Current warm daytime temperatures and rain should bring mosquitoes out. Much conern in some areas of State with potential malaria problem associated with returing servicemen from Vietnam. (Cal. Coop. Rpt.).

CATTLE LICE - OKLAHOMA - Mainly *Haematopinus eurysternus* (shortnosed cattle louse) heavy on cattle in Cotton County and moderate in Mayes and Bryan Counties. (Okla. Coop. Sur.). WYOMING - *Linognathus vituli* (longnosed cattle louse) light on calves in Campbell County. (Lloyd). *H. eurysternus* heavy on cattle in feedlot in Natrona County, required treatment. (Baribeau).

SHEEP KED (*Melophagus ovinus*) - UTAH - Numerous on university and farm flocks in Cache County, on larger flocks in Sanpete County, and on commercial flocks throughout State. Some controls applied in Utah County. (Madsen, Knowlton). WYOMING - Normal on rangeland sheep in Natrona County; not being controlled. (Baribeau).

BROWN RECLUSE SPIDER (*Loxosceles reclusa*) - ARKANSAS - Single specimen collected in home at Fayetteville, Washington County. (Boyer, Rouse).

HOUSEHOLDS AND STRUCTURES

EASTERN SUBTERRANEAN TERMITE (*Reticulitermes flavipes*) - MICHIGAN - Large swarm March 22 in building at Lansing, Ingham County. Extensive infestation found on March 25. Controls applied. Additional buildings inspected in block. (Harnett, Sauer). MARYLAND - Swarming increased in homes in central areas. (U. Md., Ent. Dept.).

OLDHOUSE BORER (*Hylotrupes bajulus*) - KENTUCKY - Larvae damaged furniture at Springfield, Washington County. (Barnett).

A MELYRID BEETLE (*Anthocomus bipunctatus*) - DISTRICT OF COLUMBIA - Collected around light in house March 21. Larvae of this European species apparently predaceous; adults may hibernate in houses. Little known of habits; beetle measures only 3-4 mm. in length. Species occurs from New Jersey to North Carolina and has been reported as far west as Kentucky. Beetle rather easily detected by bright orange elytra and black dot on each elytron. (Sollers-Riedel).

RINGLEGGED EARWIG (*Euborellia annulipes*) - OKLAHOMA - Infested buildings at Ardmore, Carter County. (Okla. Coop. Sur.).

CLOVER MITE (*Bryobia praetiosa*) - TENNESSEE - Annoying in and around homes in central areas. Controls applied in most cases. (Gordon).

BENEFICIAL INSECTS

A BRACONID (*Lysiphlebus testaceipes*) - OKLAHOMA - Occasional greenbug mummies in infested wheat in southern Ellis and Major Counties. None found in rest of northwest area. (Okla. Coop. Sur.).

CONVERGENT LADY BEETLE (*Hippodamia convergens*) - OKLAHOMA - Adults light in scattered wheat throughout northwest area, but no larvae. Adults light and larvae present in alfalfa in southwest area. (Okla. Coop. Sur.).

FEDERAL AND STATE PLANT PROTECTION PROGRAMS

EUROPEAN CRANE FLY (*Tipula paludosa*) - WASHINGTON - Second instars 40-50 per square foot in untreated check plots at Blaine, Whatcom County. Larvae not feeding. No larvae recovered from treated plots. (Rosander).

IMPORTED FIRE ANT (*Solenopsis saevissima richteri*) - GEORGIA - Specimens collected on farm at Tennille, Washington County, by F.R. Woodard on March 12, 1971. Determined by V.H. Owens, confirmed by D.R. Smith. This is a new county record. (PPD).

PINK BOLLWORM (*Pectinophora gossypiella*) - FLORIDA - Two larvae collected from wild cotton in woodland near Flamingo in Everglades National Park, Monroe County, March 16, 1971. Determined by V.H. Owens. (Fla. Coop. Sur.).

WHITEFRINGED BEETLES (*Graphognathus* spp.) - ALABAMA - Larvae damaged seedling corn in Mobile County; also damaged about 20 percent of plants in 5 acres of commerical tomatoes in Geneva County. (Kilpatrick et al.).

WOOLLY WHITEFLY (*Aleurothrixus floccosus*) - CALIFORNIA - Single adult collected from *Psidium guajave* at Fallbrook, San Diego County. Represents new area of collection and spread outside environs of San Diego. Fallbrook about 50 miles north of San Diego. Survey underway. (Cal. Coop. Rpt.).

DETECTION

New County Records - AN ARMORED SCALE (*Odonaspis penicillata*) FLORIDA - Monroe (p. 211). HOLLYHOCK WEEVIL (*Apion longirostre*) MISSOURI - Platte (p. 211). IMPORTED FIRE ANT (*Solenopsis saevissima richteri*) GEORGIA - Washington (p. 213).

LIGHT TRAP COLLECTIONS

FLORIDA - Gainesville, 3/19-25, BL - Armyworm (*Pseudaletia unipuncta*) 1, black cutworm (*Agrotis ipsilon*) 2, saltmarsh caterpillar (*Estigmene acrea*) 1. MISSISSIPPI - Stoneville, 3/19-25, 2BL, temp. 31°-71°F., precip. 1.11 - Armyworm 85, black cutworm 29, variegated cutworm (*Peridroma saucia*) 20. TEXAS - Waco, 3/19-25, BL - Armyworm 67, beet armyworm (*Spodoptera exigua*) 8, black cutworm 18, corn earworm (*Heliothis zea*) 1, granulate cutworm (*Feltia subterranea*) 42, saltmarsh caterpillar 14, variegated cutworm 57, yellowstriped armyworm (*Spodoptera ornithogalli*) 8.

HAWAII INSECT REPORT

Sugarcane - SUGARCANE LEAFHOPPER (Perkinsiella saccharicida) light, ranged 1-4 per plant, on about 20 percent of seedlings in sugarcane fields at Puunene and Omaopio, Maui. Nymphs and adults of CANE LEAFHOPPER EGG SUCKER (Tytthus mundulus) light amid leafhoppers. (Ah Sam).

General Vegetables - Larvae of DIAMONDBACK MOTH (Plutella xylostella) heavy, up to 20 per leaf, in 0.5-acre home garden planting of kai choy (Brassica juncea), won-bok (B. pekinensis), and head cabbage at Waipouli, Kauai. Many leaves severely damaged; 80-90 percent of some leaves affected. (Sugawa). Larvae of HAWAIIAN BEET WEBWORM (Hymenia recurvalis) trace in 0.25 acre of Chinese spinach (Amaranthus gangeticus) at Waimanalo, Oahu; adults light, 1 per 2 square yards. (Kawamura).

Fruits and Nuts - FLORIDA RED SCALE (Chrysomphalus aonidum) ranged 1-10 on 95 percent of pinnae on 100+ coconut trees at Kahului, Maui. (Miyahira).

Ornamentals - Larvae of GREEN GARDEN LOOPER (Chrysodeixis chalcites) heavy, about 50 percent of leaves damaged on Chinese ground orchid (Phajus grandiflora) at Wahiawa Forest Reserve, Oahu. (Kashiwai). An ARMORED SCALE (Phenacaspis cockerelli) adults trace, 1 per 15 leaves, on roadside oleander plants at Kahului, Maui. All stages moderate, about 50 per leaf, on all leaves of a Plumeria tree at Aina Haina, Oahu. (Miyahira, Kashiwai).

General Pests - Nymphs and adults of a PLATASPID BUG (Coptosoma xanthogramma) heavy on roadside Mucuna sp. at Hilo, Hawaii; as many as 25 adults per 6 inches of vine. Eggs trace on Mucuna sp.; heavy on guava and Panicum grass surrounding Mucuna vines; as many as 24 eggs per guava leaf. Ninety-two percent of eggs parasitized, probably by Trissolcus sp. (a scelionid wasp). (Yoshioka).

Beneficial Insects - Larvae of LANTANA DEFOLIATOR CATERPILLAR (Hypena strigata) heavy on wasteland lantana throughout Lanai; defoliation severe to 90 percent of plants. Numerous adults at large. Moths moderate in grassy areas at Wahiawa Forest Reserve, Oahu; about 1 per 10 square feet. (Kajiwara, Kashiwai). Larvae of a TORTRICID MOTH (Apotoforma sp.) heavy in 100 acres of wild blackberry at Waikamoi, Maui; about 75 percent of young terminal leaves infested. This leaf feeder purposely introduced from Mexico to aid in control of blackberry (Rubus sp.) and released at Olinda, Maui, in August 1964. (Ah Sam, Miyahira).

Weather of the week continued from page 208.

Maximums reached the 80's and low 90's in the Far Southwest, the low and mid-90's in the Rio Grande Valley in Texas, and the 80's in the Florida Peninsula on most days. A number of Texas stations recorded temperatures of 100° or higher Sunday afternoon. San Antonio registered 100°, the highest temperature of record for that location in the month of March. In general, temperatures averaged warmer than normal over the West and cooler than normal over the East. A large area including southern Utah, southwestern Colorado, Arizona, and New Mexico averaged 9° to 14° warmer than normal. A strip from Tennessee and northern Alabama to the Atlantic coast averaged 9° to 12° cooler than normal. (Summary supplied by Environmental Data Service, ESSA.)

SUMMARY OF INSECT CONDITIONS IN THE UNITED STATES - 1970

(Continued from page 206)

DECIDUOUS FRUITS AND NUTS

Highlights:

PEACHTREE BORER damage was heavy on stone fruits in Idaho; increased on cherry in Montana and on peach in South Carolina. This pest and LESSER PEACHTREE BORER were important pests in Alabama and North Carolina. PEAR PSYLLA persisted in California; control was a problem in Michigan and New York. WESTERN CHERRY FRUIT FLY was a severe problem in Washington. APPLE APHID was the heaviest in several years in Maine. Sooty mold resulted in a higher percentage of apples being turned into cider. SOUTHERN GREEN STINK BUG injured much peach fruit in Florida. TWOSPOTTED SPIDER MITE and EUROPEAN RED MITE were problems in the Pacific States. European red mite was heavy on apples in North Carolina, Massachusetts, and Maine. FALL WEBWORM and TWIG GIRDLER infestations on pecans were the heaviest in years in the upper Coastal Plain and upper Piedmont of South Carolina. Fall webworm was heavy on pecans in southwestern Alabama and in central Oklahoma. HICKORY SHUCKWORM, PECAN NUT CASEBEARER, BLACK PECAN APHID, and BLACKMARGINED APHID were serious on pecans in Alabama. Pecan production in the State was the lowest since 1964 due to infestations of these pests, diseases, and unfavorable environmental conditions. Losses were estimated at $10 million in Alabama.

PEACHTREE BORER (Sanninoidea exitiosa) occurs in the peach areas of southwestern IDAHO, which include Ada, Gem, Canyon, Owyhee, Payette, and Washington Counties. Adults were first found during early June. Damage was as high as 80 percent in some orchards. About 3,000 acres are treated each year. Control was successful during the winter of 1969-1970 but may be difficult during the winter of 1970-1971 because growers switched insecticides. In MONTANA, peachtree borer is becoming more and more a pest of home cherry trees in the Flathead Valley. Many trees were taken out because of it. Damage in UTAH was normal and general. Larvae in NEW MEXICO commonly infested peach trees in Valencia, Bernalillo, and Sandoval Counties. It weakened and killed trees not treated properly. Peachtree borer, along with LESSER PEACHTREE BORER (Synanthedon pictipes), was the most destructive pest of peach, plum, and cherry trees throughout ALABAMA. In FLORIDA, peachtree borer was a problem only when recommended control measures were not used, but S. pictipes, the major pest of peach trees, caused much damage. In some SOUTH CAROLINA areas, peachtree borer injury to peach increased over previous years. Numbers seemed heavier on peach, especially in the sandhills and eastern area. Peachtree borer, along with S. pictipes, was among the most important peach tree pests in NORTH CAROLINA. Moths emerged May 9, peaked August 15 to September 15, and ended after November 1.

EASTERN TENT CATERPILLAR (Malacosoma americanum) activity in OKLAHOMA began in Bryan, Marshall, and Love Counties the first week of April; small larvae were active the following week in most other areas. Damage to wild plum was heavy over most of the State during the rest of April and most of May. It was first noted in SOUTH CAROLINA on apples and cherries at Clemson, Oconee County, March 17. This pest was extremely abundant in unsprayed and abandoned apple orchards in NEW JERSEY along with other pests. Larvae nearly defoliated a block near Allentown, Monmouth County, by late May. No problems occurred in well-managed commercial blocks.

FALL WEBWORM (Hyphantria cunea) tents in WASHINGTON averaged one per apple tree during late July. Larvae were 0.25 inch long by July 20 at Puyallup, Pierce County. Numbers in MICHIGAN increased little over 1969's numbers, but larvae were locally abundant on apple trees in Ingham and Muskegon Counties.

FRUITTREE LEAFROLLER (*Archips argyrospilus*) infested apple trees at Circle, McCone County, and Malta, Phillips County, MONTANA. Early broods of OBLIQUE-BANDED LEAFROLLER (*Choristoneura rosaceana*) damaged apples and cherries, and later broods damaged fresh market prunes and plums at Milton-Freewater, Umatilla County, OREGON. Early damage was due to lack of chlorinated hydrocarbons in spray programs. Damage was above average to prunes in Marion and Polk Counties. *A. argyrospilus* in CALIFORNIA was more prevalent than for several years, but in UTAH, damage was normal but conspicuous in some orchards. REDBANDED LEAFROLLER (*Argyrotaenia velutinana*) is a minor problem in MICHIGAN. A TORTRICID MOTH (*Platynota idaeusalis*) appeared in numbers in many orchards in Adams and Franklin Counties, PENNSYLVANIA, from July through September. This was the first outbreak of this species in over 40 years. Larvae mainly fed on new growth on water spouts, resulting in very little damage to fruit. UGLYNEST CATERPILLAR (*Archips cerasivoranus*) heavily infested black cherry by July 21 in Washington County, RHODE ISLAND.

AMERICAN PLUM BORER (*Euzophera semifuneralis*) in MICHIGAN was collected in peaches, pears, and plums as far south as Fennville, Allegan County. On cherries it is probably equal to or greater in importance than LESSER PEACHTREE BORER (*Synanthedon pictipes*). For the first time in Michigan, EUROPEAN CORN BORER (*Ostrinia nubilalis*) was found in peaches.

PEACH TWIG BORER (*Anarsia lineatella*) injury in UTAH was conspicuous and above normal in Washington County and in several other orchard areas. *A. lineatella* infested 15-20 percent of poorly sprayed and unsprayed peach orchards in Mesa County, COLORADO.

SPRING CANKERWORM (*Paleacrita vernata*) damage in OKLAHOMA ranged moderate to heavy on apple trees in scattered areas of Tulsa and Mayes Counties during May. Flight activity and egg laying in OHIO by GREEN FRUITWORM (*Lithophane antennata*), *L. laticinerea*, *L. unimoda*, and *Orthosia hibisci* were delayed by an unusually cool March. Egg laying began April 9; adult activity peaked in north-central Ohio during mid-April. Larvae damaged young fruit in apple orchards by June 15.

CODLING MOTH (*Laspeyresia pomonella*) infestations in CALIFORNIA varied considerably, probably due to poor timing of treatment. Activity in the Yakima Valley of WASHINGTON was about average. Sex-lure traps captured a precocious male on April 20; male flights peaked in the Yakima Valley May 16-17. First-generation larvae appeared May 27; male flights peaked the week of July 21. Second-generation entries were noted July 14; males were collected the week of August 18. Third generation larvae were found August 28; entries of this brood were more widespread and heavier than average at Yakima, Yakima County. It infested all of southwestern IDAHO. Cover sprays gave good control where applied on time. Untreated trees approached 100 percent infestation. In MONTANA 1970 was a light year of damage for commercial growers. Codling moth in UTAH ranged light to moderate in commercial orchards, and often infested 90-100 percent of the fruit in neglected home orchards. Larvae in NEW MEXICO damaged 80-95 percent of the apples in poorly treated or untreated orchards in San Juan and Rio Arriba Counties. Infestations were lighter in Lincoln County.

Codling moth in KANSAS infested up to 100 percent and heavily damaged untreated apples in Sumner County during mid-July. The second generation in WISCONSIN was more prevalent than in 1969, based on blacklight trap collections at Madison, Dane County. The first moth emerged in southern MICHIGAN on May 21. The first larval entry occurred May 31 in the southwestern area. It produced its usual split first generation. Second-generation moths appeared July 20. No serious damage occurred. By mid-June, first-generation damage was heavier than expected in OHIO, and many entries or attempted entries were evident. Damage to unsprayed fruit trees continued heavy up to July 13 with 16-20 percent of the fruit infested in central Ohio. By September, larvae in a university orchard had damaged 22.9 percent of 200 apples per tree; damage was minor in treated orchards.

Codling moth in MARYLAND was under control in commercial apple orchards. Injury was light to slightly less noticeable in abandoned apple orchards in Monmouth and Burlington Counties, NEW JERSEY, compared with the past few years. Due to properly applied controls, it has seldom been a problem in commercial orchards during the past 10 years. Apple damage in SOUTH CAROLINA tended to increase in some locations, but has not approached the severe levels of the 1920's to 1940's.

ORIENTAL FRUIT MOTH (Grapholitha molesta) numbers were light in OREGON peach orchards. A few moths were found again near Phoenix, Jackson County. One moth was taken in regularly tended bait pots in an orchard near Grants Pass, Josephine County, for a new county record. Infestations in UTAH were controlled. Spring flights were heavy, but only a moderate spread of this new pest was observed. Adults in COLORADO appeared during late April in Mesa County. Moths peaked 3 times: May 6 (1-47 per trap), June 18-23 (2-56 per trap), and July 4-10 (1-36 per trap). Integrated control in peaches was very effective. Larvae in NEW JERSEY were abundant in unsprayed peach twigs and fruit, and were not unusual problems in well-managed orchards. Moths first appeared in Gloucester County orchards the last week of April and peaked during mid-May.

LESSER APPLEWORM (Grapholitha prunivora) in NEW YORK has been very minor for many years. Larvae only injured fruit in abandoned or poorly sprayed apple orchards in the Hudson Valley. FILBERTWORM (Melissopus latiferreanus) moths in OREGON were taken at Eugene, Lane County, in blacklight traps June 26 to August 9. Light traps during peak flights from July 25 to 27 caught a total of 98 moths with the largest catch of 48 on July 26. Increasingly important on prunes in the Willamette Valley, damage was above average in Marion and Polk Counties.

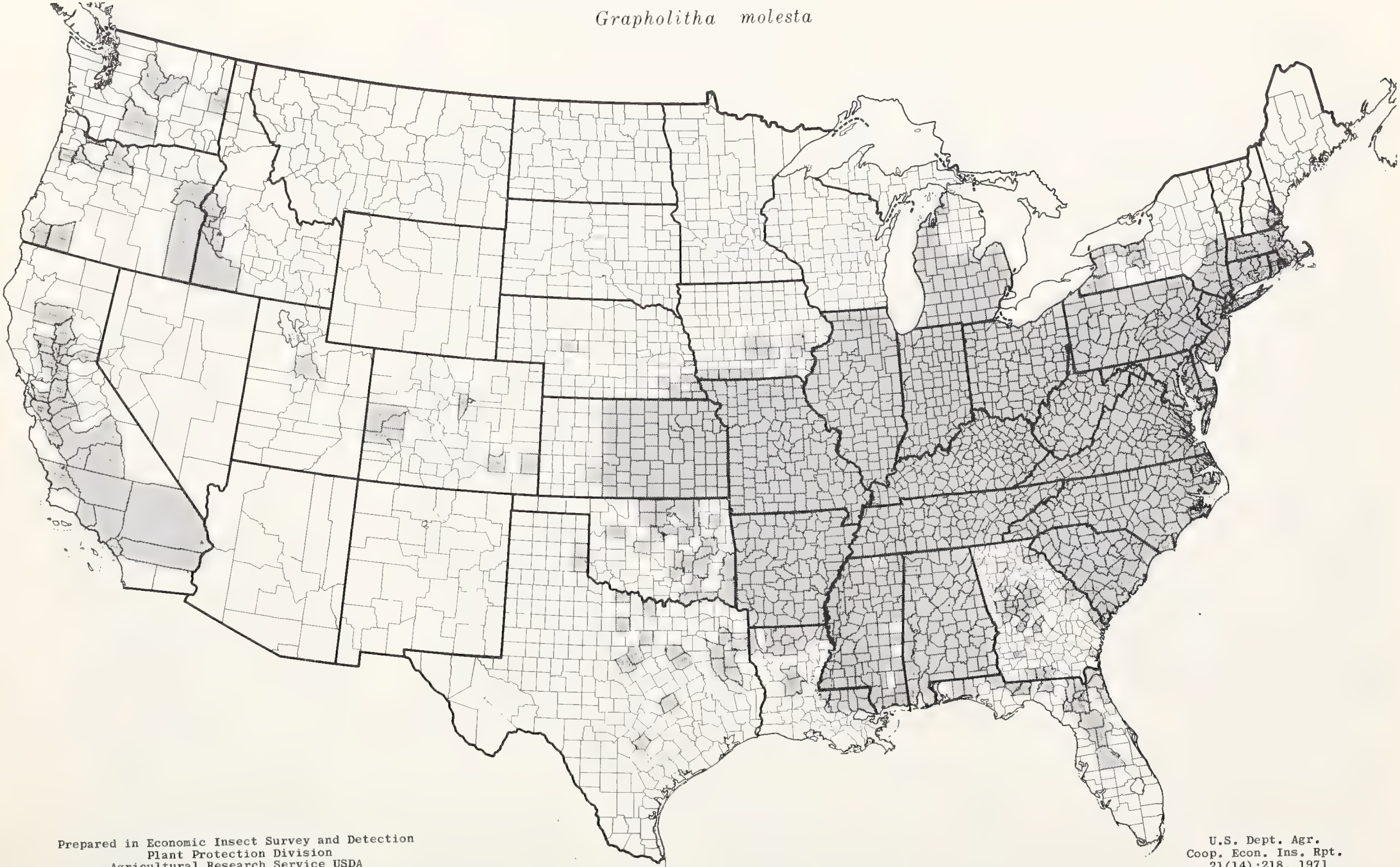
PLUM CURCULIO (Conotrachelus nenuphar) ranged light to moderate in untreated apples in Shawnee and Douglas Counties, KANSAS, during late June. Larvae built up on wild plum and moved into peach orchards during mid-July where they caused damage whenever spraying schedules were interrupted. Activity in OKLAHOMA was first noted on cherry trees in Payne County the first week of May. Plum curculio was the most serious pest to fruit of peach, plum, and apple in ALABAMA. In FLORIDA it was not a particular problem as long as spray programs were followed. Unsprayed nectarines and plums were especially vulnerable. In SOUTH CAROLINA it is now primarily a peach problem in home orchards and orchards with reduced fruit crops caused by freezes. In NORTH CAROLINA it was also a minor pest of peaches where a good spray program was followed. Plum curculio was first noted near Glassboro, Gloucester County, NEW JERSEY, on May 12. Numerous stings on tiny apple fruits were noted near Hammonton, Atlantic County, on May 18. Although it was more abundant than during 1969, little injury occurred in commercial apple orchards due to effective insecticides, and no losses occurred in commercial peach orchards. In MICHIGAN it contributed to the annual late June drop of apples, plums, and peaches, but was quickly controlled by standard sprays. More injury occurred on stone fruits, especially cherries, than in previous years, possibly due to the loss of the use of a chlorinated hydrocarbon. Larvae in WISCONSIN infested sour cherries less severely than in 1969 but severely infested apples in Dane County.

APPLE CURCULIO (Tachypterellus quadrigibbus) heavily infested cherry trees in central and western TENNESSEE. Adults puncturing the bases of the leaves caused premature drop of 50-100 percent of leaves on many trees. Larvae made fruit unfit for use.

APPLE MAGGOT (Rhagoletis pomonella) emerged in MINNESOTA on July 3 in the southeastern area, but not until August at La Crescent, Houston County, where emergence was delayed by dry conditions. Maggots were generally light; there was only one heavy case reported, this from Rochester, Olmsted County. Numbers declined by the third week in August. In WISCONSIN it was a problem on improperly treated and untreated apples. The first adults emerged in MICHIGAN June 20; shortly thereafter, temperature and rainfall combinations rapidly increased activity. Egg laying began June 30, emergence peaked July 20, and females occurred until October 7. A 10-day schedule of appropriate insecticides maintained control.

Distribution of Oriental Fruit Moth

Grapholitha molesta



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Apple maggot was abundant and injurious in abandoned orchards and backyard trees, particularly from central NEW JERSEY northward. In Burlington County, adults first appeared during the last week of June. As in previous years, many homeowners lost their entire crop. In RHODE ISLAND it injured poorly protected fruit in Washington County by September 9. Apple maggot appeared to be less abundant than in prior years. Emergence in field cages and in unsprayed or abandoned apple orchards in MAINE peaked July 22-27. Control was satisfactory in sprayed orchards. Numbers were below normal.

WESTERN CHERRY FRUIT FLY (*Rhagoletis indifferens*) infestations in OREGON were generally lighter in the Willamette Valley cherry crop, even in unsprayed orchards. Throughout central WASHINGTON, however, *R. indifferens* was a very serious problem on commercial and home trees. Maggots infested 50-75 percent of the fruit on home trees in the north-central area. Many commercial blocks near towns had extreme difficulties obtaining adequate control. Packers turned back cherry fruit throughout much of the cherry areas causing several thousand dollars of loss to growers. Half of the shippers suspended out-of-State shipments because of infested fruit. In MONTANA, *R. indifferens* was a pest in Lincoln, Mineral, Sanders, and Flathead Counties. BLACK CHERRY FRUIT FLY (*R. fausta*) first emerged in Jackson County June 5 in MICHIGAN. This fruit fly and CHERRY FRUIT FLY (*R. cingulata*) emerged June 8 in the southwestern area, and June 15 at Hart and Shelby, Oceana County, northward. Fly activity demanded carefully timed sprays from then until cherry harvest to preclude egg laying.

PEAR PSYLLA (*Psylla pyricola*) was generally heavy on pears in CALIFORNIA, persisting late into the year. Numbers in Jackson County, OREGON, were largely suppressed by a hot summer and damage was below normal; early sprays were effective. In Hood River County, although early season controls were not as effective as those applied last year, numbers for the rest of the season were light and damage was below 1969's probably due to a prolonged, hot summer. In WASHINGTON moderate to heavy numbers, as high as 100 per tray sample, of overwintered adults infested pear orchards in late February and March; control was difficult where early sprays were not applied or were ineffective. Pear psylla occurs in all areas of southwestern IDAHO--Ada, Canyon, Gem, Owyhee, Payette, and Washington Counties. The lack of a dormant spray in most orchards allowed a large first generation to occur, but cover sprays during the growing season gave adequate control. In UTAH it has spread to southern Box Elder County orchards. In Weber County, control was good, but numbers were moderately high on unsprayed orchards and trees. In MICHIGAN, resistance to an organic phosphate and a carbamate became more widespread. The economics of pear production and a diminishing choice of control measures make psylla control most difficult. In NEW YORK, although pear psylla was not as serious as in 1969, it continued to be a problem, mainly due to resistance or tolerance to insecticides. The degree of resistance varied from area to area across the State. More oil will probably be used in 1971's control programs. Pear psylla lightly infested pear in RHODE ISLAND from August 20 into October.

APPLE APHID (*Aphis pomi*), ROSY APPLE APHID (*Dysaphis plantaginea*), and WOOLLY APPLE APHID (*Eriosoma lanigerum*) were commonly damaging in various UTAH orchards during spring. *A. pomi* built up in the apple areas of SOUTH CAROLINA; certain phosphate insecticides did not give control. *D. plantaginea* was not as severe as in past years but fairly severe on apples and leaves in some South Carolina locations. In MICHIGAN the normal early season nuisance of *A. pomi* and *D. plantaginea* was prolonged by an unseasonally damp, cool June. Hatching in MARYLAND April 24, *A. pomi* remained light during spring. Infestations were kept under control in commercial orchards with spray schedules. Abundant in NEW JERSEY, *D. plantaginea* and *A. pomi* curled leaves in many commercial apple orchards by early May. Aphicides in early cover sprays reduced numbers so that injury was not significant. *A. pomi* damage in MAINE to the new terminal growth on apples was the heaviest in several years. Up to 100 aphids per newly unfolded leaf were common from the last half of June into the last part of July. Due to the resultant sooty mold, a higher percentage of apples was used for cider.

GREEN PEACH APHID (*Myzus persicae*) was reported on peach from Spartanburg County, SOUTH CAROLINA. Abundant in many peach orchards in southern NEW JERSEY, many leaves were cupped by May 15 due to *M. persicae* feeding. Numbers declined by early June due to widespread migrations to alternate hosts. No lasting injury to peaches occurred. *M. persicae* in MICHIGAN, however, has become an increasing problem in many peach orchards, particularly since the cancellation of chlorinated hydrocarbon and organic phosphate combinations. *M. persicae* conspicuously curled peach foliage during spring over much of UTAH. BLACK CHERRY APHID (*M. cerasi*) was also commonly damaging in various Utah orchards during spring.

BLACK PEACH APHID (*Brachycaudus persicae*) was reported on peach at Clemson, Oconee County, SOUTH CAROLINA. RUSTY PLUM APHID (*Hysteroneura setariae*) and MEALY PLUM APHID (*Hyalopterus pruni*) commonly infested plums during spring in UTAH.

TARNISHED PLANT BUG (*Lygus lineolaris*) adults in northern FLORIDA injured twigs and small peach fruit during April. Numbers throughout NEW JERSEY were slightly higher than in 1969. In one commercial peach orchard, crop loss was light but significant. Tarnished plant bug increased throughout NEW YORK on apples, pears, and peaches. During early spring heavy numbers seriously injured developing buds of apples and pears in prebloom stage in some cases.

SOUTHERN GREEN STINK BUG (*Nezara viridula*) was severe in northern FLORIDA peach orchards during May and June, immediately preceeding and during harvest. Much of the fruit was injured. A STINK BUG (*Euschistus conspersus*) in OREGON caused light feeding damage to peaches and pears at Medford, Jackson County.

WHITE PEACH SCALE (*Pseudaulacaspis pentagona*) has become the more important scale insect on peach and plum along with several other nonfruit host plants in southern and central ALABAMA. Moderate numbers in FLORIDA lightly damaged peach during fall in Saint Johns County and continued to be a problem in some orchards, particularly the fourth (overwintering) generation. It was still a problem on peach in Orangeburg County, SOUTH CAROLINA.

SAN JOSE SCALE (*Quadraspidiotus perniciosus*) in UTAH, was still a problem in some Weber, Salt Lake, Box Elder, and Davis County orchards. It continued to be the most important scale on peach, apple, pear, and plum in northern and central ALABAMA. In FLORIDA it was a problem in orchards and nurseries where no spray program was followed. In MARYLAND it increased rapidly at Hancock, Washington County; about 600 acres of apples needed controls.

WHITE APPLE LEAFHOPPER (*Typhlocyba pomaria*) in MARYLAND was light at Smithsburg, Washington County, and at Westminster, Carroll County, during late June. This pest has become troublesome to apple orchardists during the past few years. Detection and timely control measures have kept it below the economic threshold. Control of *T. pomaria* was difficult in many MICHIGAN orchards. In UTAH, *T. pomaria* was numerous in neglected home orchards and light to moderate in commercial orchards. PRUNE LEAFHOPPER (*Edwardsiana prunicola*) in Utah was numerous on prune foliage at Perry and Willard, Box Elder County.

PERIODICAL CICADA (*Magicicada septendecim*) was found in the fruit belt of south-central and southeastern PENNSYLVANIA. Populations were below predictions. Mostly considered a minor pest, numbers were moderate in a few orchards. In OHIO, brood X, the largest brood occurring in the State, emerged May 21 and soon covered the west-central area. Emergence lasted about 7 days. Mating and egg laying began around June 4 and ended by mid-June. Egg laying had little effect on most orchards as many growers were warned and prepared. Many homeowners, however, complained of the nuisance of cast skins and "singing." In a Fairfield County orchard, determination of nearly 500 specimens revealed 75 percent *M. septendecim*, and 25 percent *M. cassini* and *M. septendecula*. Because few reports were received outside the expected area of emergence, little change is anticipated for the 1987 distribution.

A CICADA (Diceroprocta apache) emerged abundantly during early July in the Salt River Valley, Maricopa County, ARIZONA. Much tip damage occurred on apricot, peach, and plum. Egg laying damage and a long hot, dry summer, killed many young trees.

CALIFORNIA PEARSLUG (Pristiphora abbreviata) damaged 5-60 percent of the leaves in individual pear orchards near Toppenish, Yakima County, WASHINGTON. PEARSLUG (Caliroa cerasi) injury in UTAH ranged light to moderate on susceptible fruits and ornamental shrubs. C. cerasi severely defoliated cherry trees in some NEW MEXICO areas.

EUROPEAN RED MITE (Panonychus ulmi) was a problem on peach, almond, and prune in some CALIFORNIA districts. In north-central WASHINGTON it was serious in many pear and some apple orchards with several instances of resistance. European red mite, one of two major mites on fruit in southwestern IDAHO, infested mainly apples and pears. The delayed dormant spray was applied so late in the season that eggs hatched before spraying. Summer sprays effectively held numbers below an economic level. European red mite replaced MCDANIEL SPIDER MITE (Tetranychus mcdanieli) in dominance in many northern Utah County apple orchards during 1969 and 1970 in UTAH.

European red mite buildups in MICHIGAN developed slowly until early June due to temperature and humidity relationships unfavorable to optimum adult activity and egg development. Several hot, humid spells in July accelerated the use of summer miticides. Hatch began in central OHIO by April 29. Apple trees were in early bloom. On May 1 with apple trees in full bloom, counts averaged 1.2 per leaf. Counts decreased to 0.35 per leaf by May 6, and predators were noted. Counts were heavy in Hamilton County during early June.

European red mite infestations in SOUTH CAROLINA were scattered on apples at Long Creek, Oconee County, on April 22. In NORTH CAROLINA it was the most important pest of commercial apples. Counts peaked in July and August with over 50 mites per leaf in some orchards. Predaceous mites in the family Phytoseiidae were effective in orchards using integrated control. Counts were also very abundant on peaches at Salisbury, Rowan County. On July 14, counts ranged 20-32 (averaged 27.6) per inch of lower leaf surface in the most heavily infested areas. In general, numbers on the outside leaves were heavier than on those within the crowns of the trees. Counts throughout NEW JERSEY were slightly more abundant and troublesome than in 1969. Apple leaf bronzing was not uncommon in early August. Significantly more acaricides were applied than in 1969 although economic injury was considered light. In NEW YORK it was not a serious problem where control efforts were made. It built up slowly with moderate to heavy numbers in some areas by late summer. In RHODE ISLAND, European red mite lightly infested apple in Washington County July 17-24 and for the rest of the season.

Overwintered eggs began hatching in Hampshire and Worcester Counties, MASSACHUSETTS, by May 4. Counts remained fewer than 1 adult per leaf until about July 3 when 168 were found on 50 McIntosh apple leaves in Hampshire County. Numbers were heavy on apple trees during late July and August and peaked during the week ending August 28 when 6,740 mites were found on 100 Delicious apple leaves in Hampshire County. Leaves were obviously bronzed. Numbers declined rapidly in August. Hatch on apples in central MAINE began May 10 and ended in 10 days. Counts were higher than normal with averages of up to 100 per leaf during July and August. Acaricides were required during summer.

TWOSPOTTED SPIDER MITE (Tetranychus urticae) in CALIFORNIA was probably the most common and most damaging mite on fruit and nut trees. In OREGON, mainly T. urticae and EUROPEAN RED MITE (Panonychus ulmi) built up to epidemic proportions in Jackson County pear orchards due to above normal summer temperatures. Predators were unable to keep up and control them. Damage was much higher than in 1969. By the end of the season, pear blocks subject to integrated control exhibited as good results as those under chemical control alone. MCDANIEL SPIDER MITE (Tetranychus mcdanieli) was largely held in check by predators in 5 out of 6 experimental orchards in The Dalles, Wasco County; very little damage was evident. In Hood River County, T. urticae and T. mcdanieli caused more damage this year than in 1969, while damage from P. ulmi was comparable with 1969. In WASHINGTON, T. urticae and T. mcdanieli damaged pears more than in 1969, but were not highly damaging to apples due to predator mites. One of two major mites on fruit in southwestern IDAHO, T. mcdanieli infested all pome and stone fruits. Numbers were low all season because more growers followed an integrated control program in the area, two new sprays for CODLING MOTH (Laspeyresia pomonella) were not as deterimental to mite predators as the standard control measures, and an unfavorably cool spring and summer. The predators were Metaseiulus occidentalis (a phytoseiid mite), lacewings, lady beetles, and thrips. Dominant in northern and central UTAH orchards for several years, T. mcdanieli has been replaced by P. ulmi. T. mcdanieli was a problem in apple orchards throughout NEW MEXICO, during the late summer.

Twospotted spider mite in SOUTH CAROLINA was generally heavy on apples in the foothills of Anderson and Oconee Counties and very heavy by mid-June on unsprayed apples. Numbers in NORTH CAROLINA were moderate on peaches at the research station of Raleigh, Wake County. On July 13, the heaviest concentration was on the suckers within the crowns of the trees with 5-29 (averaged 25) per inch of lower leaf surface. Numbers and injury were practically nonexistent in NEW JERSEY apple orchards. In NEW YORK, moderate numbers appeared in some orchards late in the season, but did not present a serious problem. Twospotted spider mite lightly infested apples between July 17 and 24 in Washington County, RHODE ISLAND. First reported on June 29 in MAINE, it increased rapidly on apples and persisted up to harvest so that special sprays were necessary. Because of the dry spell, the problem was greater than usual, but damage was kept to a minimum in properly managed orchards.

FALL WEBWORM (Hyphantria cunea) infestations in SOUTH CAROLINA were the heaviest in years on pecans in the upper Coastal Plain. Larvae tended to move toward houses to cocoon and thus created a problem in Clarendon and Orangeburg Counties. The second-generation became heavy in ALABAMA with 10-50 webs per pecan tree in much of the southwest area, especially in Elmore, Montgomery, Dale, Escambia, Mobile, Baldwin, and Marengo Counties. In OKLAHOMA, mating and egg laying occurred in several south-central, central, and north-central counties the last week of May. First hatching of the season was observed the same week in Murray County. Counts ranged moderate to heavy on pecan trees in the central and south-central counties during July and August and were generally light to moderate in the north-central and northeastern areas.

HICKORY SHUCKWORM (Laspeyresia caryana) larvae infested a large percentage of pecan nuts in Horry and Pickens Counties, SOUTH CAROLINA. The overwintering population in FLORIDA began emerging in February reaching a peak during period April 6-12. A late fourth generation or possibly a fifth generation infested large numbers of shucks from mature nuts. Much grower concern was evident but damage to the kernel quality was negligible. Hickory shuckworm was one of the major pests of pecans throughout ALABAMA with serious losses to nuts and quality. Infestations ranged light to moderate in most areas of OKLAHOMA during September and November.

PECAN NUT CASEBEARER (Acrobasis caryae) was found for the first time in pecan nutlets in Chaves County, NEW MEXICO, during summer of 1970. Bands were placed upon trees throughout TEXAS during April to detect adult emergence. First pupae from the spring brood were observed on April 23 in Maverick County. Emergence of spring-brood adults was essentially complete by late May. Considerable damage occurred in Texas where control measures were not employed. The first eggs in OKLAHOMA were found on May 22 in Marshall County. Cool, damp weather delayed hatching in some areas. First-generation damage ranged moderate to heavy in unsprayed orchards throughout most pecan areas during June. By July 10, second-generation larvae were present in Bryan County and first-generation pupae and newly emerged adults were present in Tulsa County. Second-generation damage was generally light except in Bryan County. Second-generation pupae were present in

Rogers County the last week of August. Larvae of this pyralid were heavy in pecans in ALABAMA during the first and second generations and accounted for some nut losses in the central and southern areas. Pecan nut casebearer and PECAN LEAF CASEBEARER (*A. juglandis*) were pests of pecans in FLORIDA only where an active spray program was not followed.

NAVEL ORANGEWORM (*Paramyelois transitella*) remained the number one pest of almonds and walnuts in CALIFORNIA.

PECAN WEEVIL (*Curculio caryae*) was found in Otero County, NEW MEXICO, for a new State record in 1970. Larvae were found in pecan nuts; larvae, pupae, and adults were collected from soil during summer; and adults were trapped during late August and early September. Treatment of 15 trees in the known infested area began in September and continued at weekly intervals until October 18. Nuts were removed from trees on October 24 and cracked as soon as husks dried in November. No larvae were found. Surveys of trees and nuts at Alamogordo and Tularosa have been negative. Adult emergence in OKLAHOMA was light in Payne County the first week of August, heavy in Rogers County the first three weeks of September, and the heaviest in Tulsa County in late September. Most heavy counts occurred in the northeastern area. Damage has become more widespread and severe in ALABAMA, especially in the southern and central sections. Pecan weevil is increasing in importance in FLORIDA. Adult emergence began in July and continued into December.

TWIG GIRDLER (*Oncideres cingulata*) infestations on pecans were the heaviest in years in SOUTH CAROLINA at several locations in the upper Piedmont, especially in Anderson and York Counties. This pest was first active on pecan in Bryan County, OKLAHOMA, during late September.

WALNUT APHID (*Chromaphis juglandicola*) was light and below normal on English walnuts in UTAH. BLACKMARGINED APHID (*Monellia costalis*), BLACK PECAN APHID (*Tinocallis caryaefoliae*) and *Monelliopsis nigropunctata* caused sticky foliage and some discoloration on pecans in Washington County during spring and early summer. *Monelliopsis caryae* was common on black walnut throughout Utah and occasionally made foliage sticky. *Monelliopsis tuberculata* and *M. californica* were very common on this host throughout the northern part of the State. In CALIFORNIA, biocontrol of walnut aphid was outstanding for the first time this season in some districts. Blackmargined aphid required treatment in numerous pecan orchards in ARIZONA. Infestations were heavy during mid-May at Safford, Graham County. In Yuma County, reoccurring populations were noted from June through October. Black pecan aphid and blackmargined aphid were heavy and damaged pecan foliage in Otero County, NEW MEXICO. Scattered light to heavy infestations in commercial plantings required treatment in Dona Ana and Luna Counties.

Black pecan aphid, blackmargined aphid, and *Monelliopsis nigropunctata* were serious on pecans in southern and central ALABAMA. Black pecan aphid was the more important species. Infestations of these aphids, along with other pests, diseases, and unfavorable environmental conditions, resulted in the lowest pecan production in the State since 1964. The yield from 925,000 trees was estimated at 15 million pounds compared with 33.5 million pounds in 1969. This is an approximate loss of $10 million. Further loss is expected in 1971 as a possible result of a poor crop caused by leaf drop during the 1970 season. Black pecan aphid was extremely light on pecans in SOUTH CAROLINA at the start of the season but increased toward normal as the season progressed.

PECAN LEAF PHYLLOXERA (*Phylloxera notabilis*) was found on pecans at several locations in SOUTH CAROLINA, including Edgefield County. In TENNESSEE, this phylloxera caused light to moderate damage to leaves and twigs of pecan trees throughout the State. In OKLAHOMA, *Phylloxera* spp. infested scattered pecan trees in the northeastern, central, and south-central areas by mid-May. Adults emerged in most areas the last week of May.

PECAN SPITTLEBUG (Clastoptera achatina) appeared frequently on pecans in Edgefield and Saluda Counties, SOUTH CAROLINA, but dry conditions during the year evidentally held this pest in check.

WALNUT HUSK FLY (Rhagoletis completa) was reported from two new western OREGON counties. Adults were collected in Frick traps in Marion County and larvae were found infesting English and black walnuts in Washington County. The infested nuts were destroyed and it is not known if this pest is established in Washington County. First adults of the season were reported from Grants Pass, Josephine County, July 15. Emergence began in Wasco, Hood River, Multnomah, Lane, and Douglas Counties during the period of July 20-24. Peaks occurred in Douglas County the last week of July, in Jackson County the first week of August, and in Wasco County the third week of August. Walnut husk fly was very heavy and widespread in CALIFORNIA, requiring considerable treatment. Dooryard treatment has reduced the incidence of this pest in these trees. In UTAH, larval infestations were general in English and black walnuts from Utah and Tooele Counties northward, including Cache County.

TWOSPOTTED SPIDER MITE (Tetranychus urticae) was probably the most common and most damaging mite on nut trees in CALIFORNIA.

CITRUS

Highlights:

CITRUS RUST MITE was a general problem on Florida citrus. CITRUS RED MITE was very heavy in most citrus areas of California. An ARMORED SCALE infested more groves and at a higher density than in the first quarter of any year in Florida. Further spread and increase are expected. WHITEFLY infestations were the heaviest in 18 years in Florida. CITRUS THRIPS was very severe in southern California and required treatment throughout the year in Arizona. SOUTHERN GREEN STINK BUG heavily damaged citrus fruit and was difficult to control in Florida.

CITRUS RUST MITE (Phyllocoptruta oleivora) was a general problem on citrus in FLORIDA, and was heavy and above normal most of the year. Infestations were moderate or heavy in about 40 percent of the groves in January and February. From April to mid-May and again in late June infestations were economic in 44 percent of the groves. By the end of July, P. oleivora had increased to a very high level. Counts for October were the highest in 19 years of record. During November, numbers decreased but were the highest in 19 years for late November. At this time about 70 percent of the groves had economic infestations compared to the normal of 48 percent.

CITRUS RED MITE (Panonychus citri) was very heavy in most citrus areas of CALIFORNIA, and YUMA SPIDER MITE (Eotetranychus yumensis) was building up late in the season in Imperial County. Citrus red mite was detected on citrus trees in several retail nurseries at Phoenix, Maricopa County, and at Tucson, Pima County, ARIZONA, during early March. The situation was kept under control by public cooperation and the infested trees were treated. It is hoped that P. citri will not survive the winter at Phoenix or Tucson. Additional surveys are underway. Citrus red mite did not reach high levels in FLORIDA until June, and continued above normal and in high range during July. The population began decreasing in August and by fall was nearly normal and generally remained in the low range. Economic infestations reached a high during late June when this mite was at economic levels in 49 percent of the groves. Lowest economic levels of 8 percent occurred in October.

SIXSPOTTED MITE (Eotetranychus sexmaculatus) was generally at very low levels and below normal most of the year in FLORIDA. Levels were highest from late May to early June when 5 percent of the citrus groves had economic infestations. A few scattered groves developed important infestations in June. Infestations of TEXAS CITRUS MITE (Eutetranychus banksi) in Florida were below normal and at very low to low levels during the first half of the year. Moderate levels were reached in July but then decreased, with levels remaining low for the rest of year. The number of groves having economic infestations ranged 2 to 38 percent, the latter occurring in mid-July. *E. banksi* was found in a lemon grove on Yuma Mesa, Yuma County, ARIZONA, in mid-November. Counts averaged 23.73 mites per leaf in mid-December. Additional light infestations were found in adjacent groves and one 5.4 miles away.

CITRUS FLAT MITE (*Brevipalpus lewisi*) was building up on citrus in the Bard Valley of Imperial County, CALIFORNIA, late in the year. Infestations were heaviest during mid-June and mid-August in Yuma County, ARIZONA. Heavy numbers were found on a variety of citrus trees at Tacna during July, and required 2 applications to effect control.

SCALE INSECTS were troublesome in Florida and California citrus this year. GLOVER SCALE (*Lepidosaphes gloverii*) populations in FLORIDA built up to a peak during May, June, and July but were at normal levels. At this time infestations were economic in 18 percent of the groves. An ARMORED SCALE (*Unaspis citri*) occurred in more groves, 25 percent, and at a higher density than in the first quarter of any prior year, but was not very active until late in March. Populations in April, May, and June were higher mainly due to the occurrence of new infestations rather than to an increase in groves already infested. By mid-July this scale reached a record high level, decreased slightly in August, and was again at the highest level on record by mid-September. At that time 28 percent of the survey groves had infestations and the infestations in 15 percent of the groves were moderate or heavy. Populations were the highest on record for October. Levels continued very high during November. Further spread and intensification of this scale are expected.

CALIFORNIA RED SCALE (*Aonidiella aurantii*) required chemical controls in citrus at many locations in CALIFORNIA. BLACK SCALE (*Saissetia oleae*) was spotty throughout California, but more abundant than previous years. Biocontrol was not as effective as normal. Black scale decreased to the lowest March level since 1963 in FLORIDA; due mainly to low temperatures in January. This scale remained very scarce in April and continued below normal despite a rapid increase in June. The seasonal peak was reached in July but was below the normal level. Economic infestations occurred in 59 percent of the groves, the norm being 63 percent. Populations declined in the fall, but were still above the normal levels for October and November.

MEALYBUGS were very scarce on FLORIDA citrus through mid-May then increased rapidly to the normal high level at the end of the June peak. Populations continued high from July through mid-August, then slowly declined. Mealybugs remained above average through September and counts were the highest in 19 years of record. When populations peaked in early summer 38 percent of the groves had economic infestations. CITRUS MEALYBUG (*Planococcus citri*) was prevalent in coastal Santa Barbara County and present in other coastal citrus areas of CALIFORNIA.

Larvae and pupae of CITRUS WHITEFLY (*Dialeurodes citri*) and CLOUDYWINGED WHITEFLY (*D. citrifolii*) began the year above normal and at a high level in FLORIDA. Population levels in March were the highest in 19 years of record. These pests infested 61 percent of the groves with 35 percent harboring moderate or heavy infestations. Whiteflies continued above normal with the May and June levels the greatest in 18 years of record in Florida. In June, 88 percent of the groves were infested and 10 percent had heavy infestations; however, little damage was evident. Heavy infestations occurred in 16 percent of the groves in July. Record high levels were noted during July, August, and September. A downward trend had begun by October, but infestations were still above normal. Infestations were economic in 18 percent of the groves. Whiteflies had decreased to moderate levels by November, with only 2 percent of the groves having economic infestations.

CITRUS THRIPS (*Scirtothrips citri*) was very severe in southern CALIFORNIA and present in varying degrees in other citrus areas. Treatments were required throughout the year in commercial citrus nurseries in Yuma County, ARIZONA. Citrus thrips is the number one pest to new-budded nursery stock. Spray programs, after bloom, were conducted in groves in Yuma and Maricopa Counties.

MELON APHID (Aphis gossypii) was the most prevalent species on citrus in CALIFORNIA. Melon aphid was heavy on new growth of many citrus trees in the Salt River Valley in Maricopa County, ARIZONA, from mid-March through April.

SOUTHERN GREEN STINK BUG (Nezara viridula) caused heavy damage to citrus fruits during summer and fall in the Hastings area of Saint Johns County, FLORIDA. Control was difficult.

BEET ARMYWORM (Spodoptera exigua) larvae damaged young citrus buds and new growth in ARIZONA. However, the larvae were unable to complete a life cycle on this host.

OTHER TROP. & SUBTROP. FRUITS

A LEAFHOPPER (Idona minuenda) was found for the first time in CALIFORNIA on Brazil peppertrees at Pomona, Los Angeles County, on January 12, 1970. Brazil peppertree is not a recorded host.

SMALL FRUITS

WESTERN GRAPELEAF SKELETONIZER (Harrisina brillians) damage was more severe than during the past 14 years in Washington County, UTAH. Some damage was also reported from San Juan County. In NEVADA, infestations were light at Las Vegas, Clark County, during spring. Populations and damage were above normal by fall in Clark County. Medium populations were observed at Goodsprings.

Larvae of a TORTRICID MOTH (Archips georgiana) completely devastated the blueberry crop in abandoned NEW JERSEY fields in 1969 and 1970. Damage was moderate in some cultivated fields in 1969, but in 1970 control efforts were satisfactory. REDBANDED LEAF ROLLER (Argyrotaenia velutinana) has often been observed in cultivated blueberries in New Jersey. Economic infestations developed in several fields late in August. Most of these fields were located close to apple orchards. ORANGE TORTRIX (A. citrana) larvae were observed feeding in caneberries in Multnomah County, OREGON, in March. Early activity was apparently due to unusually mild and warm weather during February.

CRANBERRY FRUITWORM (Acrobasis vaccinii) eggs were first observed in NEW JERSEY on May 25 and entries were found on May 29. Entries into blueberries occurred from May 29 to June 13 and peaked about June 4. Infestations were generally much lighter than normal and confined mostly to Weymouth, Rancocas, and Concord blueberry varieties. A GRACILLARIID MOTH (Gracillaria vacciniella) was very abundant in many fields in Atlantic County, New Jersey in 1970. Several fields had more than 50 percent of the leaves infested. This pest was considerably less abundant on wild blueberry bushes and in cultivated fields in Burlington County where spraying was not as intensive. This pest apparently does not affect production of blueberries, but mechanical harvesters vibrate them off bushes into the mass of berries where their presence down grades quality.

CHERRY FRUITWORM (Grapholitha packardi) infestations in NEW JERSEY was light. GRAPE BERRY MOTH (Paralobesia viteana) larvae were unusually damaging to grape berries in a few vineyards in the "Dixie" area of Washington County, UTAH. IMPORTED CURRANTWORM (Nematus ribesii) was common in black currants growing along fence rows in the State.

STRAWBERRY CROWN MOTH (Synanthedon bibionipennis) and STRAWBERRY CROWNMINER (Aristotelia fragariae) damaged 90 percent of 0.5 acre of strawberries in early May at Brush Prairie, Clark County, WASHINGTON. CURRANT BORER (S. tipuliformis) was light on currants in the Oregon City area of Clackamas County, OREGON, in mid-March. OMNIVOROUS LOOPER (Sabulodes caberata) was an increasing pest of grape vineyards in CALIFORNIA.

STRAWBERRY LEAFROLLER (*Ancylis comptana fragariae*) was moderately abundant during spring in Cache and Salt Lake Counties, UTAH. This leafroller was the most commonly reported pest of small fruits in INDIANA, replacing *Altica chalybea* (grape flea beetle) in importance on these crops. GRAPE ROOT BORER (*Vitacea polistiformis*) severely damaged grape vineyards in York, Chester, and Union Counties, SOUTH CAROLINA. Damage was reported about April 1. Pupation occurred in Union County about July 1.

Adults of STRAWBERRY ROOT WEEVIL (*Brachyrhinus ovatus*), *B. rugosostriatus*, and less commonly BLACK VINE WEEVIL (*B. sulcatus*) were unusually numerous in northern and central UTAH. Damage to strawberry and raspberry roots was most common. Adults of *B. singularis* in WASHINGTON destroyed 50 percent of the buds in 0.5 acre of Willamette raspberries at Puyallup, Pierce County, by early May, but did not affect a 0.5-acre planting of Sumner raspberries.

STRAWBERRY WEEVIL (*Anthonomus signatus*) became a recent problem in MICHIGAN. The frequency of economic damage to strawberries increased from southern to northern counties, including the Upper Peninsula. About 60-70 percent loss of fruit buds was observed in several 2 and 3-year-old plantings. This pest damaged blossoms on commercial blackberries in 3 separate fields in Putnam County, FLORIDA, during early April. PLUM CURCULIO (*Conotrachelus nenuphar*) remains a minor pest of blueberries where a good spray program is followed in NORTH CAROLINA. Adults were jarred from blueberry bushes in NEW JERSEY on May 12, but egg punctures were not noted in the field until May 15. Infestations were generally much lighter than normal.

Migrations of a SAP BEETLE (*Stelidota geminata*) into strawberry plantings coincided with harvest in MICHIGAN. Much loss occurred with late harvest. Weekly bait applications gave satisfactory control. Adults of a FLEA BEETLE (*Altica* sp.) damaged buds and young leaves of grapes in Mayes County, OKLAHOMA, during late April and early May. Plants grew normally after controls were applied but very little fruit was produced on infested vines. SUGARBEET WIREWORM (*Limonius californicus*) killed many grape plants near Caldwell, Canyon County, IDAHO.

BLUEBERRY MAGGOT (*Rhagoletis mendax*) adults were first trapped on baited sticky-board traps on June 12 in NEW JERSEY. This was 3 days later than in 1969 and 3 days earlier than in 1968. There was the usual prolonged flight period lasting through August, and peaks occurred from July 6 to July 18. Last instars were found in the field on July 8. Adult trap collections were heavier than in 1969, but larval infestations were much lighter. There was a sharp decline of larval infestations after July 21, although adults continued to be trapped. A warm drought period may have contributed to this. Blueberry maggot adults in NORTH CAROLINA emerged the week of May 30 and peaked June 22 to July 7. A total of 280 adults were caught in 6 blueberry fields (4-10 acres) in Pender County on 28 baited sticky boards per field. This was one-tenth the number taken during the same period in 1969. Larvae appeared the week of June 15 and peaked June 29 to July 13. A total of 1,562 larvae were collected from 54 quarts of randomly picked berries between June 15 and July 27. This was five times the number collected during the same period in 1969. Some fields had been aerially treated 3 times.

TWOSPOTTED SPIDER MITE (*Tetranychus urticae*) infested strawberries in Spartanburg County, SOUTH CAROLINA. This pest was found throughout the year and severely damaged strawberries at Bradenton in Manatee County, FLORIDA. MCDANIEL SPIDER MITE (*Tetranychus mcdanieli*) damage to raspberry foliage in UTAH was late in developing and less severe generally. Some damage occurred to red currant and gooseberry foliage.

REDBERRY MITE (*Acalitus essigi*) caused 30-40 percent fruit loss on 40 acres of evergreen blackberries in the Junction City area of Linn County, OREGON. Overwintering adults were light to moderate in fruit spurs of thornless evergreen blackberries grown in Marion County during October. BLUEBERRY BUD MITE (*Acalitus vaccinii*) infestations were light in NEW JERSEY and were observed only on Rancocas and Weymouth blueberry varieties.

OLIVE SCALE (*Parlatoria oleae*) was found on olive trees and fruit in a few scattered locations in CALIFORNIA. VIRGINIACREEPER LEAFHOPPER (*Erythroneura ziczac*) and other species discolored home plantings of susceptible grape varieties in UTAH. A LARGID BUG (*Largus cinctus californicus*) was more abundant than normal and damaged bushberry plants and fruit and strawberry fruit in CALIFORNIA. WESTERN FLOWER THRIPS (*Frankliniella occidentalis*) infested bushberry fruits at harvest which seriously affected marketings of berries in Fresno County. TARNISHED PLANT BUG (*Lygus lineolaris*) increased throughout NEW YORK on strawberries, blackberries, and raspberries. Numbers were heavy in early spring. Injury varied but was extensive in some plantings.

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